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New aircraft carrier recovery technology moves one step closer to fleet integration



Sailors use a new Compact Swaging Machine (CSM) for the first time to attach an arresting gear wire terminal on the flight deck of the aircraft carrier USS Ronald Reagan (CVN 76). The first operational fleet test of the highly anticipated CSM was successfully completed May 12, when the machine was used to install new terminals on purchase cable arresting wires. The CSM is designed to reduce workload and dramatically increase the quality of life for flight deck Sailors. (U.S. Navy photo by Mass Communication Specialist 3rd Class Ruben Reed/Released)

NAVAL AIR SYSTEMS COMMAND, PATUXENT RIVER, Md. — The new Compact Swaging Machine (CSM), responsible for automating a current hazardous process and reducing Sailor workload, successfully completed its first operational fleet test aboard the USS Ronald Reagan (CVN 76) May 12.

The CSM uses hydraulic pressure to mold, or swage, a terminal onto an aircraft carrier purchase cable. This terminal connects to a cross-deck pendant that stretches across the flight deck, which engages the tail hook of a landing aircraft allowing for a smooth, controlled arrestment.

“The CSM automates a process that has been practiced by the fleet since the Navy started using aircraft carrier arresting gear,” said Jim Raevis, CSM team lead.

On the morning of May 9, the prototype CSM that had been placed in an ISO freight container was craned aboard the CVN 76 flight deck. On May 12, four new terminals were

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successfully swaged onto purchase cables, and within hours of CVN 76 leaving port in San Diego, California, the cables began taking arrestments from manned aircraft.

“Endorsed as the number one priority by the ALRE (Aircraft Launch and Recovery Equipment) community at the last three meetings of the Aviation Boatswain’s Mates Association, the CSM will dramatically increase the quality of life for the Sailor,” said Andrew Sussman, recovery integrated product team lead for the U.S. Navy’s ALRE Program Office (PMA-251).

After each newly-swaged wire has accrued 500 arrestments, or aircraft landings, estimated to happen by late this summer, the cables will then be cropped and shipped to Joint Base McGuire-Dix-Lakehurst in Lakehurst, New Jersey, where personnel will conduct residual life testing.

“We are going to test the terminals and wires to their point of destruction to discover how much strength remains,” Raevis said. “That’s the type of testing we have conducted every step of this program.”

The current time-intensive process of replacing a terminal requires four to six Sailors and can take up to 12 hours to complete. During this process, zinc is heated to 1,000-degrees Fahrenheit in a small space onboard the ship, and the molten metal is then poured into a socket. Special care is required during this risky process, and the work must be repeated if strict material tolerances are not met.

PMA-251 and industry partner, Creare Engineering Research & Development, while under NAVAIR Small Business Innovation Research (SBIR) contract, designed the advanced hydraulic system.

“The CSM requires only one Sailor and forms the replacement terminal in an hour,” said Cmdr. Tony Hernandez, ALRE fleet liaison officer. “Needless to say, the machine’s capability will leave a lasting impression in naval history.”

“The plan forward is to remove socket pouring across the fleet in total, replacing it with CSMs in each and every ship,” Raevis said, adding that fleet installations are currently planned to begin in 2018.